

dividing by the dry weight of the root system the weight of CO_2 produced is least in barley and greatest in oats. This quotient is considered as the indication of the specific energy of respiration.

The authors point out that the injury to farm crops by insufficient aeration of the soil probably arises from the accumulation of the highly toxic organic acids due to the incompletely oxidized products of respiration.

It should be mentioned here that the authors have studied only the aliphatic excreta and make no mention of any of the aromatic series.—WM. CROCKER.

Graft hybrids.—The question of the occurrence of graft hybrids has long been undecided, and the possibility of their existence has even been denied. WINKLER undertook an extensive series of experiments on this subject, using as material two species which will not hybridize in the ordinary manner, namely *Solanum nigrum* and *Solanum lycopersicum*. In an earlier paper¹³ he dealt with the production of what he calls chimeras, that is shoots, one side of which resembles either parent, the cells of the two parents growing in juxtaposition without modifying each other. He has finally succeeded¹⁴ in producing a true graft hybrid between the same species by the same method.¹⁵ In all, 268 grafts were made, which after decapitation produced over 3000 adventitious shoots. Five of the latter were chimeras and a single one a graft hybrid, which came from grafting *S. lycopersicum* on *S. nigrum*. After decapitation the cut surface of one graft produced 14 adventitious shoots, 8 of which were pure *S. nigrum*, 5 *S. lycopersicum*, and 1 the graft hybrid. The latter was detached and rooted, finally producing flowers. It is intermediate in character between the parents, though somewhat nearer *S. nigrum*. The purity of both parents was assured by using guarded "pure line" cultures. WINKLER names the hybrid *S. tubingense*, and proposes to use the sign + for graft hybrids instead of \times , the sign for a sexual cross. Two other adventitious shoots are also probably intermediate in character, one of them being nearer the *S. lycopersicum*.

STRASBURGER,¹⁶ in a cytological study of the reputed graft hybrid *Cytisus Adami*, found the number of chromosomes to be the same as in each parent. Several interesting cytological questions, which WINKLER hopes to determine, are involved in the nuclear and chromosome behavior of his graft hybrid. Apparently there must be a union of cells, nuclei, or chromosomes, or perhaps of all three, in the production of this form.—R. R. GATES.

¹³ WINKLER, HANS, Ueber Pfropfbastarde und pflanzliche Chimären. Ber. Deutsch. Bot. Gesells. 25:568-576. figs. 3. 1907.

¹⁴ ———, *Solanum tubingense*, ein echter Pfropfbastard zwischen Tomate und Nachtschatten. Ber. Deutsch. Bot. Gesells. 26a:595-608. figs. 2. 1908.

¹⁵ Briefly described by the reviewer in BOT. GAZETTE 47:84. 1909.

¹⁶ STRASBURGER, E., Ueber die Individualität der Chromosomen und die Pfropfhybriden-Frage. Jahrb. Wiss. Bot. 44:482-555. pls. 5-7. fig. 1. 1907.